

REMARKS/ARGUMENTS

§112 Rejections

Claims 1 and 13 are rejected under 35 U.S.C. §112, first paragraph, for lack of support for amending “containing/comprising” to “consisting essentially of” in the response filed July 28, 2008. Applicants respectfully traverse this rejection.

Applicants again point out the following. M.P.E.P. §2111.03 states:

The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original)

The M.P.E.P. elaborates further with reference to *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1240-41, 68 USPQ2d 1280, 1283-84 (Fed. Cir. 2003):

Applicant's statement in the specification that "silicon contents in the coating metal should not exceed about 0.5% by weight" along with a discussion of the deleterious effects of silicon provided basis to conclude that silicon in excess of 0.5% by weight would materially alter the basic and novel properties of the invention. Thus, "consisting essentially of" as recited in the preamble was interpreted to permit no more than 0.5% by weight of silicon in the aluminum coating.

In accordance with the foregoing, Applicants' assert that mass % values of C, Si, Mn, P and S outside the ranges as claimed (e.g., see claim 1) would materially alter the basic and novel properties of the presently claimed invention. More specifically, the current specification elaborates on each of these elements individually, starting on page 12, line 25, to page 14, line 16, as reproduced below:

- “C is an element indispensable for securing a strength required of a wire rod and C of 0.6% or more is added accordingly. A C content is preferably 0.65% or more, yet preferably 0.7% or more. On the other hand, when a C content exceeds 1.0%, it becomes difficult to inhibit pro-eutectoid cementite, which functions as origins of wire breakage, in the cooling process after hot-rolling. A preferable C content is 0.95% or less.” (page 13, lines 8)
- “Si is an element that increases the strength of ferrite in pearlite and contributes to the adjustment of strength and is also useful as a deoxidizing agent. In order to exhibit

such functions effectively, Si must be added by 0.1% or more and a preferable Si content is 0.12% or more. In contrast, when Si is added excessively, the ductility of ferrite in a steel is deteriorated and wire breakage is likely to occur. For that reason, the upper limit of an Si content is set at 1.5%, and a preferable Si content is 1.3% or less.” (page 13, lines 10-19)

- “Mn is an element useful for securing the hardenability of a steel and enhancing the strength thereof. Mn of 0.3% or more (preferably 0.35% or more) is added in order to exhibit such functions effectively. In contrast, when Mn is added excessively, segregation occurs during cooling after hot-rolling and a supercooled structure, such as martensite, detrimental to wire drawability tends to form. For that reason, the upper limit of an Mn content is set at 1.0%. A preferable Mn content is 0.8% or less.” (page 13, line 21, to page 14, line 2)
- “P is an element that deteriorates the toughness and ductility of a steel and hence the upper limit thereof is set at 0.02% in order to prevent wire breakage in the processes of wire drawing and subsequent stranding. A P content is preferably 0.01% or less, yet preferably 0.005% or less.” (page 14, lines 4-9)
- “S, like P, is an element that deteriorates the toughness and ductility of a steel and hence the upper limit thereof is set at 0.02% in order to prevent wire breakage in the processes of wire drawing and subsequent stranding. A S content is preferably 0.01% or less, yet preferably 0.005% or less.” (page 14, lines 11-16)

Clearly these statements found within Applicants’ current specification provide a showing of “materially affecting the basic and novel characteristics of the claimed invention” as was determined in *AK Steel Corp. v. Sollac* with similar statements.

Accordingly, such detailed statements with respect to C, Si, Mn, P and S discussing the good and bad of each individual element of the steel composition as well as the benefits and detriments of lower and upper content limits of each of the individual elements, would allow one skilled in the art to recognize that Applicants were in possession, at the time of filing, of a steel composition limited to those essential elements. It would be illogical to conclude that Applicants were not in possession of the core embodiment of the claimed invention (e.g., containing C, Si, Mn, P and S as essential elements), but were in possession of an open-ended version of the core embodiment that *may or may not* include other elements.

Therefore, Applicants request withdrawal of this rejection.

§103(a) Rejections

A. *Minami* (“Drawing High-Grade Steel Wire Rods Without Heat Treatment”, Wire Journal International, Vol. 16, pp. 236-247, Sept. 1983)

Claims 1 and 18 are rejected under 35 U.S.C. §103(a) as obvious in view of *Minami*. Applicants respectfully traverse this rejection.

The Office asserts that *Minami* discloses “tensile strength, reducing area, deviation of tensile strength, and deviation of reducing area (Table 4, 6, Fig. 7-9 of NPL-1), which reads on the corresponding limitations in the instant claims” (Office Action, page 5, second full paragraph). Furthermore, the Office asserts that *Minami* discloses “the similar two step cooling (Fig. 2 and 4 of NPL-1) as recited in the instant claim 18” (Office Action, page 6, first paragraph). Applicants submit that these assertions are incorrect for the following reasons.

Figures 2 and 4 of *Minami* show that a wire rod is cooled by a one-step cooling due to the fact that the cooling rate in Loop Conveyor 8 is constant with no change during the course of the cooling. Such a one-step cooling is not “similar” to Applicants’ claimed two-step cooling in claim 18. Additionally, Table 4 of *Minami* shows a Cr-V steel having a tensile strength of 100 kgf/mm^2 , which corresponds to 1078 MPa. When TS^* is calculated for the Cr-V steel according to the equations as claimed by Applicants, TS^* is 1211 MPa. Also, when TS_{AV} is calculated for the Cr-V steel according to the equations as claimed by Applicants, TS_{AV} should be in the range of 1181 to 1241 MPa. However, Table 4 of *Minami* shows that the Cr-V steel only has 1078 MPa.

Furthermore, the steels of Table 6 of *Minami* have RA_{AV} values outside that claimed (i.e., not greater than 35% as required). The closest example has $RA_{AV} = 35\%$ (not greater than). Even this example of *Minami* does not satisfy the claimed mechanical property

limitations because it has a TS_{AV} range of 1088 to 1148 MPa (in accordance with claimed calculations) but has a value of 1225 MPa instead which is outside the calculated range.

Therefore, the steels of *Minami* having overlapping elemental content ranges with those claimed do not meet all 4 mechanical property limitations (i.e., TS_{AV} , TS_{σ} , RA_{AV} , RA_{σ}) of Applicants' claims. Thus, *Minami* does not render obvious Applicants' claims because *Minami* does not disclose or suggest all 4 mechanical property limitations or their combination with the specific elemental composition.

Accordingly, Applicants request withdrawal of these rejections.

B. *Kuroda* (US 6,372,056), *Tsukamoto* (US 5,156,692) and *Bae* (US 6,264,759)

Claims 1, 3, 5, 6 and 18 are rejected under 35 U.S.C. §103(a) as obvious in view of *Kuroda*. Claim 2 is rejected under 35 U.S.C. §103(a) as obvious in view of *Kuroda* and *Tsukamoto*. Claims 8, 10-13 and 15-17 are rejected under 35 U.S.C. §103(a) as obvious in view of *Kuroda* and *Bae*. Claims 9 and 14 are rejected under 35 U.S.C. §103(a) as obvious in view of *Kuroda*, *Bae* and *Tsukamoto*. Applicants respectfully traverse these rejections.

These rejections are maintained and re-applied for the same reasons as recited in the previous Office Action. The Office has not been persuaded with Applicants' previously presented arguments of the criticality of the claimed C, Si, Mn, P and S content ranges due to *Kuroda's* exemplified contents of Si, Mn, P and S falling within those claimed ranges. Furthermore, it appears that the Office has ignored Applicants' showing of criticality with respect to the claimed content of C and has not addressed our arguments concerning the criticality of C and/or its critical combination with the other four elements (i.e., Si, Mn, P and S). Accordingly, it is the Applicants position that the Office has improperly maintained the rejections in view of *Kuroda*.

Despite this error, Applicants have amended the independent claims (i.e., claims 1, 8, 13 and 18) to narrow the Si and P content ranges, thus placing *Kuroda*'s exemplified contents of Si and P outside the corresponding claimed ranges. Accordingly, *Kuroda*'s sole exemplary embodiment does not meet 3 of the 5 claimed content limitations of C, Si, Mn, P and S. Therefore, not only have Applicants previously provided a showing of criticality of the claimed content of C and its critical combination with the other four essential elements, but Applicants have now eliminated the portion of the Si and P ranges that encompassed the sole exemplary amounts of Si and P. For ease of comparison, please refer to the following table comparing the 5 essential elements of Applicants' claims versus *Kuroda*.

Applicants' claims	<i>Kuroda</i>'s sole embodiment (see col. 5, Table 1)	
C = 0.6 - 1.0%	C = 0.57%	* <i>Kuroda</i> outside claimed range
Si = 0.1 - 0.85%	Si = 1.47%	* <i>Kuroda</i> outside claimed range
Mn = 0.3 - 1.0%	Mn = 0.71%	
P = 0.01% or less	P = 0.011%	* <i>Kuroda</i> outside claimed range
S = 0.02% or less	S = 0.009%	

In view of the foregoing and the following remarks, Applicants submit that *Kuroda* does not render obvious Applicants' claims. *Kuroda* discloses a steel composition comprising 0.38-0.85% of C, 0.25-2.10% of Si, 0.2-1.0% of Mn, less than 0.035% of P and less than 0.035% of S (col. 4, lines 60-61) but only exemplifies 0.57% of C, 1.47% of Si, 0.71% of Mn, 0.011% of P and 0.009% of S (see table above). Thus, the "preferred" working ranges as disclosed by *Kuroda* would be (i) the upper end of Si and P, not the lower end like claimed by Applicants, and would be (ii) the lower end of C, not the upper end like claimed by Applicants. With this in mind, one skilled in the art would have no motivation to look

below the “preferred” thresholds for Si and P, and above it for C. Furthermore, courts have held that where, as here, the prior art disclosure suggests the outer limits of the range of suitable values, and that the optimum resides within that range, and where there are indications elsewhere that in fact the optimum should be sought within that range (all examples), the determination of optimum values outside that range may not be obvious (*In re Sebek*, 465 F.2d 902, 175 USPQ 93, 95 (CCPA 1972)). Thus, without any motivation to consider C amounts above 0.57%, Si amounts below 1.47% and P amounts below 0.011%, Applicants’ claims are not rendered obvious in view of *Kuroda*.

Furthermore, not only does *Kuroda* lack motivation to consider the claimed amounts of C, Si and P individually as described above, but *Kuroda* also lacks motivation to consider the combination of all three of these claimed amounts (i.e., C, Si and P), and in addition, lacks motivation to consider such a 3-part-combination with the specific claimed amounts of Mn and S for a 5-part-combination. As described above, *Kuroda* does not disclose or suggest the C-Si-P combination as claimed; therefore, *Kuroda* surely cannot then disclose or suggest a C-Si-P-Mn-S combination incorporating the C-Si-P combination. Accordingly, the combination of the specific ranges of amounts of the five essential elements (i.e., C, Si, Mn, P and S) is not rendered obvious by *Kuroda*.

As neither *Tsukamoto* nor *Bae*, nor their combination, fulfills the deficiencies of *Kuroda* as described above, any combination of *Kuroda*, *Tsukamoto* and *Bae* also does not render obvious Applicants’ claims.

Consequently, none of *Kuroda*, *Tsukamoto*, or *Bae*, or any combination thereof, discloses or suggests a hot-rolled wire rod as claimed by Applicants and having the critical mass % ranges of the components, as well as satisfying all 4 mechanical property limitations (i.e., TS_{AV} , TS_{σ} , RA_{AV} , RA_{σ}).

Accordingly, Applicants request withdrawal of these rejections.

Conclusion

Applicants submit that all now-pending claims are in condition for allowance.
Applicants respectfully request the withdrawal of the rejections and passage of this case to issue.

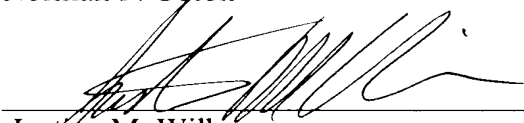
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